



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/591,449

09/01/2006

Yuji Aoki

AOKI3008/GAL

1641

23364 7590 11/12/2008

BACON & THOMAS, PLLC

625 SLATERS LANE

FOURTH FLOOR

ALEXANDRIA, VA 22314-1176

EXAMINER

MICALI, JOSEPH

ART UNIT

PAPER NUMBER

4181

MAIL DATE

DELIVERY MODE

11/12/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/591,449	<b>Applicant(s)</b> AOKI ET AL.	
	<b>Examiner</b> JOSEPH V. MICALI	<b>Art Unit</b> 4181	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 01 September 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>9/1/06, 10/3/06</u> .   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Status of Application***

Claims 1-26 are pending and presented for examination on the merit.

### ***Claim Objections***

1. Claims 6-8, 10 and 24 are objected to because of the following informalities: Claims 6-8 mistakenly write "mol %" with the number 1 instead of the letter l. Claims 10 and 24 mistakenly use a symbol " $\leq$  =" when a "less than or equal to" sign is just " $\leq$ " with no equal sign afterwards needed. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that

Art Unit: 4181

the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary.

Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

**5. Claims 1-9, 11, 19-23, and 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 6,764,770 by Paranthaman et al, in view of US 1Patent Pub. No. 2004/0157747 by Chen et al.**

With respect to claims 1-3, Paranthaman teaches a rare earth superconductor device comprising a metal substrate, intermediate buffer layer(s) containing Mn (and possibly Be, Mg, Ca, Sr, Ba, and Ra) with Ce, Y, Nd, Sm, Gd, Eu, Yb, Ho, Tm, Dy, or Er, and a surface layer of  $\text{REBa}_2\text{Cu}_3\text{O}_7$  (e.g., YBCO) or other superconductor (**claim 6**).

Paranthaman does not expressly teach intermediate layers where cerium is paired with a solid solution formation element (Y, Nd, Sm, Gd, Eu, Yb, Ho, Tm, Dy, La, and Er) or a charge compensation element (Bi, Nb, Sb, Ta, and V) or both.

Chen is drawn to a superconducting product comprising a metallic substrate, a high  $T_c$  superconductor layer, and doped metal oxide buffer layer(s) (**claim 1 and paragraph 0041**). The buffer layer is further defined to comprise cerium oxide doped with possibly a transition metal oxide (such as Nb, Ta, or V),

Art Unit: 4181

a lanthanide metal oxide (such as  $\text{Sm}_2\text{O}_3$ ,  $\text{Y}_2\text{O}_3$ , or  $\text{Gd}_2\text{O}_3$ ), or combinations thereof (**claims 7-8**).

Both Paranthaman and Chen are drawn to similar superconducting articles, containing a metal substrate, intermediate layer(s), and superconducting layer, both containing cerium as a preferred embodiment. At the time of invention it would have been obvious to a person of ordinary skill in the art to perform the process of Paranthaman with cerium intermediate layers containing a solid solution formation element, a charge compensation element, or both, in view of the teaching of Chen. The suggestion or motivation for doing so would have been to improve property matching between superconductor layer and metal substrate as well as to prevent cracking (**paragraph 0007 and 0016**).

With respect to claims 4 and 19-20, both Paranthaman and Chen teach a superconductor with a solid solution formation element being Y, Gd, and Sm, while Paranthaman teaches Nd, Eu, Yb, Ho, Tm, Dy, or Er as well (**Paranthaman, claim 6, and Chen, claim 8**).

With respect to claims 5 and 21-22, Chen teaches a superconductor with a charge compensation element being Nb, Ta, or V (**claim 7**), as those three elements fall into the category of transition elements.

With respect to claims 6-9 and 23, Chen teaches a superconductor with solid solution formation elements, charge compensation elements, and combinations of the two (**claims 7-8**). The detailed embodiment is through Sm, a solid solution formation element, and gives a Sm concentration of 1% to about 35% in terms of the metal content (**claim 9 and paragraph 0036**). In **MPEP**

Art Unit: 4181

**2144.05 [R-5] Obviousness of Ranges**, “In the case where the claimed ranges ‘overlap or lie inside ranges disclosed by the prior art’ a prima facie case of obviousness exists,” and thus, covers 5 to 60 mol%. As Chen discusses the use of charge compensation elements but gives the example of Sm to represent all the possibilities, it is inherent to use similar concentrations for charge compensation elements and combinations thereof.

With respect to claims 11 and 25-26, both Paranthaman and Chen teach a superconductor where the metal substrate is a biaxially aligned metal substrate (see **Paranthaman, claim 6, and Chen, claim 2**).

**6. Claims 10 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over US ‘770 by Paranthaman et al, in view of US ‘747 by Chen et al, as applied to claims 1-9, 11, 19-23, and 25-26 above, and further in view of US Patent No. 4,959,348 by Higashibata et al.**

Regarding claim 10 and 24, Paranthaman in view of Chen do not explicitly teach a superconductor where the mole ratio of the charge compensation element, such as Bi or Sb, to the solid solution formation element, such as Y, is less than or equal to 1.2.

Higashibata is drawn to a superconductor where Y and Bi or Y and Sb are found in a mixture where the ratio of Sb or Bi to Y is less than 1.2 (**claim 2 and page 2, lines 17-21**).

At the time of invention it would have been obvious to a person of ordinary skill in the art to perform the process of Paranthaman and Chen with a mole

Art Unit: 4181

ratio of charge compensation element to solid solution formation element less than or equal to 1.2, in view of the teaching of Chen. The suggestion or motivation for doing so would have been to increase the attainable current density of the superconductor (**column 1, lines 50-52**).

**7. Claims 12-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 6,764,770 by Paranthaman et al, in view of US Patent Pub. No. 2004/0157747 by Chen et al, and further in view of US Patent No. 5,444,040 by Kojima et al.**

Chen provides a method for making a rare earth oxide superconductor including depositing a doped cerium based oxide, biaxially textured, buffer layer on a metallic substrate followed by forming an HTS layer on top of the buffer layer. The depositing step can be any process designed to form thin films, including pulsed laser deposition (PLD), sputtering, physical vapor deposition, metal organic chemical vapor deposition (MOCVD), metal organic deposition (MOD) or mixtures or combinations thereof (**paragraph 0019**). Metal substrates include Ni and alloys (paragraph 0035), and the reference specifies Sm-doped (0.01-0.35%) CeO<sub>2</sub> (0040; 0053). The reference specifically or inherently meets a majority of the claimed limitations.

Together, Paranthaman and Chen do not teach a heat treatment (or calcination) step in the range of 900 to 1,200° C.

Kojima is drawn to the method of making a YBCO superconductive oxide single crystal, including a step of calcining the material at 800 to 950° C, with further heat treatment reaching but not passing 1,200° C (**claim 1**). **MPEP**

Art Unit: 4181

**2144.05 [R-5] Obviousness of Ranges** states, "In the case where the claimed ranges 'overlap or lie inside ranges disclosed by the prior art' a prima facie case of obviousness exists."

At the time of invention it would have been obvious to a person of ordinary skill in the art to perform the process of Paranthaman and Chen with a heat treatment temperature range of 900 to 1,200° C, in view of the teaching of Kojima. The suggestion or motivation for doing so would have been to provide an optimal growing temperature for sufficient melting and film formation (**Kojima, column 6, lines 10-14**).

#### ***Conclusion***

8. Claims 1-26 are not allowed.
9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOSEPH V. MICALI whose telephone number is (571)270-5906. The examiner can normally be reached on Monday through Friday, 7:30am to 5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, VICKIE KIM can be reached on (571)272-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



Art Unit: 4181

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JOSEPH V MICALI/  
Examiner, Art Unit 4181

/Vickie Kim/  
Supervisory Patent Examiner, Art Unit 4181